

REMARKS

Claims 1-25 are pending in the application.

Claims 1-25 are rejected.

Claim 17 is amended to correct a typographical error.

New claim 26 is added.

No new matter is added.

Claims 1-14, 25 and 27 remain in the case.

Applicant requests reconsideration and allowance of the claims in light of the above amendments and following remarks.

Claim Objections

Claim 17 is objected to because of the following reason.

In claim 17, line 10, "...a insulating tape... is misspelled.

Claim 17 is amended, eliminating the typographical error.

Claim Rejections-35 U.S.C. § 103

Claims 1-3, 5, 7-12, 14, 16-19, 23-25 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Background or the invention in view of U.S. Patent No. 6,552,426 to Ishio, et al., ("Ishio").

Applicant respectfully traverses the rejections.

The present invention is directed toward decreasing the overall thickness of a multi-chip module by reducing the thickness between stacked chips where each of the lower stacked chips have bonding wire connections positioned between the lower and upper stacked chip. The present invention eliminates extra space currently required in these modules to avoid bonding wires contacting an overlying stacked chip by applying *an insulating tape* to the backside of the overlying stacked chip.

Specifically looking at independent claim 1, the claim recites at least one top chip having an insulating tape attached to its backside. The use of an insulating tape allows for a reduced total height of stacked chips because wires bonded to the bottom chip do not come in direct contact with the top chip. See lines 8-12, page 7 of the present application.

The examiner has stated, in the office action, that Ishio teaches the top chip having an insulating tape attached thereof. However, the examiner has not pointed to specific teachings

of Ishio regarding the limitations relation to, for example, the insulating tape of the present invention.

In contrast, the die attaching material 4 disclosed in the Ishio reference does not correspond to the insulating tape 63b of the claimed invention. In detail, multi-chip modules of Ishio illustrated in Figs. 9, 10 and 11, the lower chips 1 and 23 are wider than the top chips 5, 11 and 25. Further, the pads 2 of the lower chips 1 and 23 are not located under the top chips 5, 11 and 25. Thus, there is no need for the die attaching material 4 to act as the insulating tape of the present invention. Even if the die attaching material 4 is not provided, the bonding wires 8 connected to the lower chips 1 and 23 would not contact the top chips. Therefore, the die attaching material 4 of Ishio rather corresponds to the insulator 61 of the claimed invention, not to the insulating tape 63b of the claimed invention. See FIG. 3 of the present application.

In addition, semiconductor chips are typically covered with a passivation layer, which has pad openings to expose metal pads such as pads 2 of Ishio and the pads 57 and 65 of the present invention. Thus, the first insulator film 3 described in Ishio corresponds to the passivation layer rather than the insulator 61 of the claimed invention. In the present application, the conductive bumps 57a and 65a of the claimed invention are located higher than the passivation layer. That is, the conductive bumps 57a are formed to protrude from the top surface of the passivation layer. (Although this feature is not illustrated in Fig. 3, one skilled in the art would understand this aspect of the claimed invention as is well known in the art.) Thus, applicant respectfully submits that the insulator 61 of the claimed invention is not a passivation layer.

For these reasons, the Ishio reference fails to teach "the insulating tape 63b" of the present invention. The combination of the Background of the Invention and Ishio does not disclose each and every element of the independent claim 1, and thus independent claim 1 is allowable and allowance is respectfully requested.

Claims 2-3, 5 and 7-9 depend from claim 1, and for at least the same reasons are allowable and allowance is respectfully requested for these claims.

Independent claim 10 also recites an insulating tape attached to the backside of a top chip.

As described above, Ishio does not disclose an insulating tape on a top chip. The combination of the Background of the Invention and Ishio fails to disclose each and every element of amended independent claim 10. Thus, independent claim 10 is allowable and allowance is respectfully requested.

Claims 11-12, 14 and 16 depend from claim 10, and for at least the same reasons are allowable and allowance is respectfully requested for these claims.

As to independent claim 17, Ishio and the Background of the invention does not disclose the insulating tape and thus fail to disclose each and every element of independent claim 17. Amended Claim 17 is allowable and allowance is respectfully requested.

Claims 18-19 and 23-25 depend from claim 17, and for at least the same reasons these claims are allowable and allowance is respectfully requested.

Claims 4 and 13 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Background of the invention in view of U.S. Patent No. 6,706,557, Koopmans ("Koopmans").

Applicant respectfully traverses the rejections.

Koopmans does not disclose an insulating tape attached to the backside of a top chip. Thus Koopmans fails to cure the deficiencies of the Background of the Invention as they pertain to independent claims 1 and 10. Since claims 4 and 13 depend from independent claims 1 and 10, respectively, claims 4 and 13 include all of the limitations of those amended independent claims.

Even if the combination of the Background of the Invention and Koopmans further included Ishio, as described above, Ishio fails to disclose an insulating tape on the backside of a top chip.

Consequently, claims 4 and 13 are allowable and allowance is respectfully requested.

Claims 6, 15, 20 and 22 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Background of the invention in view of U.S. Patent No. 6,333,562, Lin ("Lin").

Applicant respectfully traverses the rejections.

Claim 6 depends from amended independent claim 1 and thus includes all of the limitation of claim 1. Claim 15 depends from amended independent claim 10 and thus includes all of the limitation of amended claim 10. Claims 20 and 22 depend from amended independent claim 17 and thus include all of the limitations of amended claim 17.

The inclusion of Lin fails to disclose an insulating tape on the backside of the top chip. Thus, claims 6, 15, 20 and 22 are allowable and allowance is respectfully requested.

Claim 21 is rejected under 35 U.S.C. § 103 (a) as being unpatentable over Background of the invention in view of U.S. Patent Application Publication 2003/0038374 to Shim, et al., ("Shim").

Applicant respectfully traverses the rejections.

Claim 21 depends from amended independent claim 17 and thus includes all of the limitation of amended claim 17. The inclusion of Shim also fails to disclose an insulating tape on the backside of the top chip. Thus claim 21 is allowable and allowance is respectfully requested.

In conclusion

For the foregoing reasons, reconsideration and allowance of claims 1-26 of the application as amended is solicited. The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

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Respectfully submitted,

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